

The Thunderstorms of May 29 and the Louth Disaster.

THE last week of May was marked by hot weather all over the country and by numerous thunderstorms, which culminated in the notable downpours of rain which occurred on Saturday, May 29. The highest temperatures were reported on Tuesday, May 25, when 82° F. was reached in London and the Thames Valley. In London the magnificent cumulus clouds made a fine spectacle, but it was further north, in the neighbourhood of Luton, that thunderstorms occurred. Paris suffered from a severe storm on the same day.

On Wednesday, May 26, when an area of comparatively low pressure extended across England and Ireland, there were thunderstorms in London and in other parts of the country during the afternoon. The rainfall in the west of London was exceptionally heavy. The area affected was somewhat sharply outlined on the west. At Hammersmith the roads were flooded and wood pavements burst up by the water, but at the Meteorological Office, a couple of miles away, only 2 mm. of rain fell. At Uxbridge 33 mm. fell in half an hour.

The distribution of pressure remained irregular, but lower over the British Isles than over neighbouring countries, and on Friday evening a "low," which appears to have originated over the South of France, began to deepen and to move northward. The map for 7h. G.M.T. on Saturday, May 29, indicates the depression by the isobar 1012.5 mb. over the Bristol Channel. At 13h. pressure was below 1012 mb. over the Midlands. By 18h. it had fallen to 1009 mb. in the same region. On Sunday morning the depression was over the North Sea, and by the evening, when it had deepened to 1004 mb., it was centred at the Shetlands.

The rainfall on May 29 was insignificant in the South of England, but falls of half an inch or more were general from Nottingham northwards. The exceptional falls in Lincolnshire and Lancashire occurred before the northward passage of the trough of lowest pressure. As to the downpour in Lincolnshire, to which the damage and loss of life at Louth are to be attributed, records are available from Hallington, in the valley west-south-west of the town, and from Elkington Hall, on the hills to the north-west. In each case the measurement was about 120 mm. in two hours, giving a mean rate of fall of 1 mm. per minute. According to newspaper reports, 100 mm. fell at Horncastle, twelve miles south-south-west of Louth.

The area with an exceptionally heavy rainfall included Bucknall, sixteen miles south-west of Louth, with a total fall of 54 mm.; at Lincoln, twenty-four miles away, the fall was 52 mm.; and at Spurn Head, to the north, it was 35 mm. The boundary of the area of heavy rain is marked by 34 mm. at Cranwell and 12 mm. at Fulbeck, these places being about four miles apart on either side of the Ermine Street, south of Lincoln. At Skegness only 12 mm. fell. There were two thunderstorms in the afternoon, both carried westward by the wind on the north side of the cyclone. One was at Skegness at 13.15 G.M.T., and at Lincoln at 14.30. The other, which was the more severe, moved more slowly, passing Skegness at 16h. and Lincoln between 18.30 and 19h.

The Louth disaster seems to have been associated with the former storm. From the evidence at the inquest of a witness from Benniworth, a village on the far side of the Wolds, in the Bain Valley, it appears that after a little rain between 13h. and 14.15 the weather cleared, but that at 14.30 the rain suddenly poured so fast that the house-pipe could not

carry it. "In a moment the fields were at least 8 in. deep in water. I saw a huge cloud in the shape of an egg which kept twisting round. There were three flashes of lightning, very vivid and very shocking. One seemed to pierce through the cloud, and immediately afterwards the cloud seemed to come earthward."

Examination of the ground by the deputy coroner indicated that the heavier rainfall had been on the north side of the line from Louth to Lincoln, and that it was more severe higher up the valley than at Hallington, where the rain-gauge, which measured 120 mm., was situated. It is likely that the 120 mm. is a fair average for the fall over the basin of the Lud above Louth. This basin contains three or four brooks which unite above the town and drain an area of about 20,000 acres. The Wolds are chalk hills, however, and no doubt the greater part of the normal drainage is underground. This may account for the absence of any provision for the passage of flood-water, but much of the ground slopes at about 100 ft. to the mile, so that water would run off rapidly. Rainfall at the rate of 1 mm. per minute over an area of 80 sq. km. would feed a stream 5 metres deep and 100 metres wide rushing along at 160 metres a minute, and the Lud does not appear to have reached such a magnitude as this. The town seems to have been singularly fortunate in escaping floods in the past, as a rainfall of even one-quarter of that on the present occasion could scarcely have found its way through the narrow bridges of the town.

With regard to the heavy falls in Lancashire, we are so fortunate as to have the autographic record from the rain-gauge at Leyland, to the south of Preston. The total fall for the twenty-four hours, 9h.-oh. May 30-31, is about 80 mm., "the like of which the proverbial oldest inhabitant cannot remember." The heaviest downpours were from 16.30 to 17h. and from 17.55 to 18.15. In the latter interval of twenty minutes no less than 40 mm. were recorded. The more dramatic exploits of the flood-water due to this storm appear to have been to the north of Preston, where the main line of the London and North-Western Railway was interrupted by the destruction of the embankment near the crossing of the River Brock. In spite of the long duration of the rain at Preston, the fall at Blackpool, fifteen miles to the west, amounted to only 5 mm. in the twenty-four hours.

Annual Meeting of the British Science Guild.

THE annual meeting of the British Science Guild was held in the Goldsmiths' Hall on Tuesday, June 8, the chair being taken by Lord Sydenham, president of the guild.

In his address on "Science and the Nation" the president referred to the strike evil as one of the great industrial problems of the day. The moulders' strike had seriously affected many industries; loss in coal had reached 50,000,000 tons a year as compared with 1913, with serious consequences to the export trade. The evil was due partly to an abnormal state of mind arising from the war, but was originally fostered by the industrial changes of the last century, namely, the general use of machinery, rendering labour monotonous and leaving less room for the individual skill of the craftsman, and the formation of large companies, whereby the personal touch between master and man was lost. Capital unduly concentrated in a few hands might lead to tyranny. This country needed a wider distribution of capital. Labour and capital must be reconciled, and science must find an

antidote for the deadening influence of the machine. In the latter portion of his address Lord Sydenham emphasised the importance of a more general knowledge of science, especially amongst members of the Government and the Civil Service, and alluded to the efforts made by the Guild in the dissemination of scientific knowledge and methods. He concluded by quoting Goethe's saying that "there is no more dreadful sight than ignorance in action."

Lord Sydenham then introduced the president-elect, Lord Montagu of Beaulieu, who delivered an address on "Some National Aspects of Transport," and afterwards occupied the chair. Lord Montagu remarked upon the growing difficulties of railways, which, although subsidised by the State, were working with a diminishing margin of profit owing to the vast increases in cost of materials and in wages. Some of the largest tramway systems, such as the L.C.C. in London, were incurring actual loss, and a general increase in fares and rates seemed inevitable. Some economies might be achieved by more scientific methods of handling traffic and the elimination of competition, but the saving from this source appeared relatively small. The possibilities of road transport, therefore, assumed importance. Already the comparative cheapness of short-distance road-borne traffic had deprived the railways of much revenue. Existing roads, however, were unfitted to bear very heavy mechanical traffic. On a tar-macadam road the tractive force was 40-45 lb. per ton, three times the force on rails, and on bad roads up to 100 lb. per ton may be needed. In the pre-railway period roads carrying metal tracks 2 ft. wide were constructed for carts carrying coal, minerals, etc. It might be feasible to lay such a plateway from London to Birmingham with a tractive force of only 20 lb. per ton. The cost of a double track would be about the same as for a single line of railway, as gradients up to 30:1 could be used. The cost of operation would be on a smaller scale than on railways, and goods could be delivered direct from door to door. The idea could be extended to other large towns, and it was conceivable that overhead roadways, for the exclusive use of fast-running vehicles, might be made from the suburbs. The creation of such routes would lead to a material increase in the value of property through which they passed, and part of the cost might be met by a local transport benefit tax, applied in such cases.

Lord Montagu also referred briefly to other possible developments, such as the use of the airship for long distances and aeroplanes for shorter services, and the possible use of gas suction plant for propelling locomotives, motor-lorries, and ships, and of benzol and alcohol in the internal-combustion engine.

In view of the national importance of these problems, the creation of a chair of transport at one of the leading universities would be a deserving object for private beneficence. The two Institutions of Civil Engineers and Mechanical Engineers should be more frequently consulted by the Government in regard to road transport, and the National Physical Laboratory had done excellent work. The problem, however, was so vast as to demand continuous research at a special establishment.

The adoption of the annual report of the Executive Committee was proposed by Lord Bledisloe, and seconded by Sir Gilbert Parker, both of whom are vice-presidents of the Guild. A cordial tribute was paid to the valuable services Lord Sydenham had rendered to the Guild during his tenure of office, and both speakers expressed the general appreciation of Lord Montagu's acceptance of office as the new president.

The report, summarised by Lord Bledisloe, dealt with various aspects of the work of the Guild. The

second British Scientific Products Exhibition, held in 1919, was honoured by a visit from both King George and Queen Mary, accompanied by Prince Henry and Princess Mary, and demonstrated the growing appreciation by British manufacturers of the value of applied science. During the present year it is hoped to arrange a conference on science and labour in association with the Labour Party. A representative committee is being set up to collect full data on the utilisation of science, not only in the Civil Services, but also in all Government Departments, and the Parliamentary Committee, which has already intervened with good effect in the Forestry Bill, will watch all prospective legislation involving scientific and technical issues. The Education Committee of the Guild is still pressing for a real survey of the existing provision of university and higher technical education in the country, considering that the new Standing Committee on University Grants, acting under the Board of Education, is inadequate as regards composition and reference. The revised specifications of the Technical Optics Committee in regard to microscopes have already been adopted by two British firms.

The adoption of the report having been carried unanimously, the proceedings were terminated by a vote of thanks to the Master and Wardens of the Goldsmiths' Company for permission to hold the meeting in their hall.

Annual Visitation of the Royal Observatory, Greenwich.

DURING the war this annual function was restricted to the official visit of the members of the Board. It has now returned to the conditions that prevailed many years ago, a large and representative gathering of astronomers and their friends being present on Saturday, June 5, to take part in the inspection of the observatory and instruments.

The return of many members of the staff who had been at the Front has naturally brought about a large increase in the number of observations. Those made with the transit circle exceed eight thousand in each element. In addition to the customary observations of sun, moon, planets, and clock-stars, the observing list now includes the stars selected by Backlund and Hough as secondary standards distributed with fair uniformity over the sky. Observations for this catalogue will be completed at the end of 1921.

The error of the moon's place in longitude for 1919, as predicted in the Nautical Almanac, was $-12.26''$, showing a notable diminution of nearly $2''$ from the value for the three preceding years. The Astronomer Royal explains that this change is due to the omission in Hansen's tables of several sensible planetary terms. In view of the imperfections of these tables, it is satisfactory to note that Brown's new lunar tables have now been printed and are used in the Nautical Almanac, starting with the year 1923.

Two of the equatorials are now out of use. The 28-in., the mounting of which dates from 1851, requires renewal of the upper pivot; this work has been entrusted to Messrs. T. Cooke and Sons. The driving clock of the astrographic equatorial was sent to Sir H. Grubb for repairs, which are still in progress. The observations of double-stars made with the 28-in. since its erection have been discussed by Mr. Jackson, who has published more than twenty new orbits in the Monthly Notices for March and April last. Fuller details of these and other systems will be printed in the Greenwich annual volumes. There are many systems for which orbits cannot yet be deduced, but where relative motion is shown; hypo-